PB-220 031

EVALUATION OF THE TEXACO STRATIFIED CHARGE (TCP) M-151 ARMY VEHICLE

Henry L. Gompf

Environmental Protection Agency
Ann Arbor, Michigan

August 1972

DISTRIBUTED BY:

NTIS

National Technical Information Service
U. S. DEPARTMENT OF COMMERCE
5285 Port Royal Road, Springfield Va. 22151

73-31

APTD-1378

PB 220 031

Evaluation of the Texaco Stratified Charge (TCP) M-151 Army Vehicle

August 1972

Reproduced by
NATIONAL TECHNICAL
INFORMATION SERVICE
U S Department of Commerce
Springfield VA 22151

Henry L. Gompf
Control Device Evaluation Section
Environmental Protection Agency

4

BIBLIOGRAPHIC DATA SHEET	1. Report No. APTD-1378	2.	3. Recipient's Accession No.
4. Title and Subtitle: Evaluation of the Texaco Stratified Charge (TCP) M-151 Army Vehicle			5. Report Date: August 1972 6.
7. Author(s): Henry L. Gompf			8. Performing Organization Rept. No.
9. Performing Organization Name and Address: ENVIRONMENTAL PROTECTION AGENCY Control Device Evaluation Section Ann Arbor, Michigan			10. Project/Task/Work Unit No. 11. Contract/Grant No.
12. Sponsoring Organization Name and Address: Same			13. Type of Report & Period Covered: Inhouse 14.

15. Supplementary Notes

16. Abstract: Previous tests have indicated that the TCP M-151 vehicle was consistently meeting low emission levels dictated by 1976 Federal emission standards. This paper describes the subsequent confirmatory test program. The vehicle tested was an Army M-151 1/4-ton truck with a four speed manual transmission. The 141 CID engine was modified to incorporate a stratified charge, multifuel combustion process. An EGR system using a high and low flow rate valve was installed for oxides of nitrogen control. Three catalytic reactors were employed for the oxidation of hydrocarbon and carbon monoxide: a platinum plated swirl reactor, an Englehart PTX platinum catalyst and a Texaco copper chromite reactor. The Texaco version of the stratified charge engine M-151 vehicle was tested three times. The test procedure used was that specified for 1975 model year certification. Test results indicated that the TCP stratified charge vehicle met the required emission levels for the 1976 model light duty vehicles. No estimate of durability can yet be made.

17. Key Words and Document Analysis. 17a. Descriptors

Air pollution
Military vehicles
Exhaust emissions
Stratified charge engines
Catalytic converters
Tests
Standards
Hydrocarbon
Carbon monoxide
Nitrogen oxides
Carbon dioxide

17b. Identifiers/Open-Ended Terms

Texaco Stratified Charge Engine

17c. COSATI Field/Group 13B

18. Availability Statement: Unlimited

19. Security Class (This Report) UNCLASSIFIED

20. Security Class (This Page) UNCLASSIFIED

21. No. of Pages 4

22. Price $3.00/0.75

Background

In testing this spring at the Texaco Laboratories it was indicated that the TCP M-151 vehicle was consistently meeting low emission levels dictated by 1976 Federal emission standards. The following emission values are the average of three tests performed in the Texaco laboratory immediately prior to delivery of the vehicle to EPA.

Hydrocarbon	0.28 grams per mile
Carbon Monoxide	0.86 grams per mile
Oxides of Nitrogen	0.31 grams per mile

As part of our cooperative effort with the U.S. Army and to expand on our previous evaluations of the emission characteristics of this vehicle, a confirmatory test program was scheduled in the EPA laboratory.

Vehicle Tested

The vehicle tested was an Army M-151 1/4-ton truck with a four speed manual transmission. The 141 CID engine was modified to incorporate a stratified charge, multifuel combustion process. In addition, an EGR system using a high and low flow rate valve was installed for oxides of nitrogen control. Three catalytic reactors were employed for oxidation of hydrocarbon and carbon monoxide: a platinum plated swirl reactor, an Englehart PTX platinum catalyst and a Texaco copper chromite reactor. The vehicle was operated on a mixture of Texaco no-lead pump fuel and 2 percent lubricating oil.

Test Program

The Texaco version of the stratified charge engine M-151 vehicle was tested three times. The test procedure used was that specified for 1975 model year certification. Details of this procedure are described in the July 2, 1971, Federal Register.

Due to the presence of lubricating oil in the fuel, additional continuous analyses of hydrocarbon emissions were made using a heated flame ionization detector.

Test Results

The following table presents the emission data compiled during the EPA evaluation.

1975 FTP Emission Results
(all results in grams per mile)

Date	HC*	CO	CO_2	NOx
5/10/72	0.40	0.27	566.2	0.30
5/11/72	0.33	0.12	539.1	0.31
5/12/72	0.37	0.31	549.6	0.30
Average	0.37	0.23	551.6	0.30

It should be noted that the TCP vehicle was not capable of meeting the acceleration requirements of the LA4-S4 driving schedule.

Conclusions

The TCP stratified charge vehicle met the required emission levels for 1976 model light duty vehicles. No estimate of durability can yet be made.

* Due to technical operational problems the results of the heated flame ionization detector were inconclusive. Cold FID data are reported.